EDEXCEL FUNCTIONAL SKILLS PILOT

Maths Level 1

Chapter 7
Working with probability

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Chapter 7: Working with probability

Use these free pilot resources to help build your learners' skill base

We are delighted to continue to make available our free pilot learner resources and teacher notes, to help teach the skills learners need to pass Edexcel FS Mathematics, Level 1.

But use the accredited exam material and other resources to prepare them for the real assessment

We developed these materials for the pilot assessment and standards and have now matched them to the final specification in the table below. They'll be a useful interim measure to get you started but the assessment guidance should no longer be used and you should make sure you use the accredited assessments to prepare your learners for the actual assessment.

New resources available for further support

We're also making available new learner and teacher resources that are completely matched to the final specification and assessment – and also providing access to banks of the actual live papers as these become available. We recommend that you switch to using these as they become available.

Coverage of accredited specification and standards

The table below shows the match of the accredited specification to the unit of pilot resources. This table supersedes the pilot table within the teacher notes.

Coverage and Range	Exemplification	Learner Unit
Use data to assess the likelihood	- Put events in order of likelihood on a probability scale - Justify decisions based on the probability scale - Explain results from the context of statistical diagrams and calculations	**K1** Measuring probability Wider coverage can be found in our new publishing (see below)
		K2 Remember what you have learned

Where to find the final specification, assessment and resource material

Visit our website **www.edexcel.com/fs** then:
- **for the specification and assessments:** under **Subjects**, click on **Mathematics (Levels 1–2)**
- **for information about resources:** under **Support**, click on **Published resources**.

Pilot material only – see introduction before use

K Working with probability

You should already know:

✔ simplify common fractions to their lowest terms.

By the end of this section you will know how to:

▷▷ use probability to show that some events are more likely to occur than others

▷▷ calculate simple probabilities.

1 Measuring probability

The likelihood of events

📖 *Learn the skill*

The measure of the likelihood of an event is called the **probabilty of an event**. Some events are more likely to occur than others.

Events that are definitely going to happen are described as **certain**. People are right when they say, 'The only thing we can all be sure of is that one day we will die'… this is a certain event.

Events that are definitely *not* going to happen are described as **impossible**. Events such as 'daylight lasting 24 hours in Britain' are impossible.

Other events may be **likely** or **unlikely**. The probability of it raining in England during the summer months is now **likely**. The probability of winning the National Lottery is **unlikely**.

▷▷ *Try the skill*

Decide whether the following events are impossible, unlikely, likely or certain.

a   It will snow on Mount Everest next year _____

b   The canteen at a factory serves food for lunch _____

c   You win first prize in a competition _____

d   There will be a cure for cancer in the next year _____

e   All the world's governments will agree to reduce carbon emissions _____

Measuring probability

As there is no chance of impossible events happening, the probability of **impossible events** is **zero**.

Certain events will definitely happen; the probability of **certain events** is **one**.

All other events have a probability between 0 and 1.

Unlikely outcomes have a probability closer to 0 than 1.

Likely outcomes have a probability closer to 1 than 0.

Outcomes that are equally likely of happening or not happening have a probability of $\frac{1}{2}$.

Example 1: What is the probability of it being light all night in England?

This is an impossible event.

Answer: 0

Example 2: What is the probability of a mother-to-be giving birth to a girl?

A boy or a girl child are equally likely.

Answer: $\frac{1}{2}$

Example 3: Position these events onto the probability line between 0 and 1.
**A** When you throw an ordinary coin, it will show heads.
B If you live a healthy life you will reach the age of sixty.
C When you buy a raffle ticket, you will win.
D Water will freeze at 100 °C.

Answer: There is an equal chance of tossing a head or a tail when you throw an ordinary coin, so even A is in the middle.

If you live a healthy life, you are reasonably likely to live to be 60 years old, so event B is closer to 1 than 0.

When you buy a raffle ticket, you are not very likely to win, so event C closer to 0.

There is no chance of water freezing at 100 °C so event D is at 0.
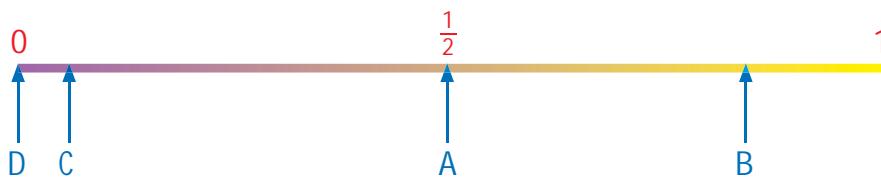
⏩ *Try the skill*

1. Position these events on to the probability line below.

   a You will eat today.

   b You will meet an alien today.

   c You will pass your numeracy test.

0 $\frac{1}{2}$ 1
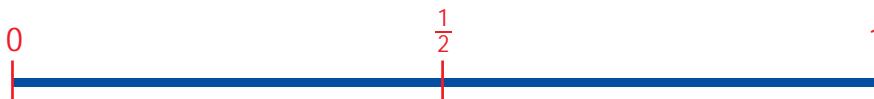
2. A bag of sweets contains 3 humbugs and 3 chocolate limes. If you pick one sweet from the bag without looking, what is the probability that you pick

   a a sweet? _____

   b a stick of chewing gum? _____

   c a humbug? _____
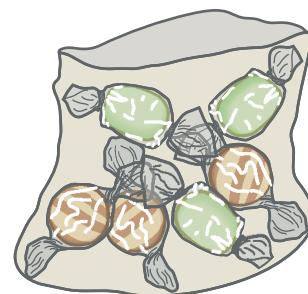
Probabilities which are not 0 or 1

We know that the probability of tossing a coin and getting a 'head' with an ordinary coin is $\frac{1}{2}$. This can also be written as 0.5 or 50%.

When you toss a coin, there are only 2 possible outcomes: heads or tails.

Heads is 1 outcome out of a possible 2, or $\frac{1}{2}$.

This leads to a method for calculating probability.

> **Tip**
>
> Probabilities can be written in fractions, decimals or percentages.

▷ The probability of an outcome = $\dfrac{\text{number of ways the outcome occurs}}{\text{Total number of outcomes}}$

Example 1: When you throw an ordinary dice, what is the probability of scoring:
a 6   **b** An odd number?

a 6 is on one face of the dice. There are 6 faces in total.

Answer: Probability (scoring 6) = $\frac{1}{6}$

b There are 3 odd number faces, 1, 3 and 5.

Answer: Probability (scoring an odd number) = $\frac{3}{6} = \frac{1}{2}$

Example 2: A sock drawer contains 2 red socks, 1 black sock and 5 white socks. If you pick out a sock from the drawer without looking, what is the probability that the sock is:
a red   **b** white

a There are 2 red socks, and there are 8 socks in total.

Answer: Probability (picking out a red sock) $= \frac{2}{8} = \frac{1}{4}$

b There are 5 white socks out of a total of eight.

Answer: Probability (picking out a white sock) $= \frac{5}{8}$

Remember

Simplify fractions to their lowest terms where possible.

➡ Try the skill

1. An ordinary dice is thrown. What is the probability of scoring:

   a 2 _____

   b an even number _____

   c a number more than 3 _____

   d a number less than 3 _____

2. A bag of sweets contains 5 toffees, 10 chocolate éclairs and 10 pieces of fudge.

   If you pick a sweet out at random, what is the probability of picking out:

   a a toffee _____

   b a chocolate éclair _____

   Tip

   'At random' means not aiming for a particular result.

   Challenge question!

3. A packet of cards contains 20 cards numbered 1 to 20. All even cards are red and all odd cards are blue.

   If you pick one card out a random, what is the probability of picking out

   a card number 1 _____

   b a blue card _____

   c a card with a multiple of 5 on it _____

   Remember

   Multiples of 5 are 5, 10, 15, …

2 Remember what you have learned

First complete this …

▷ The measure of the likelihood of an outcome of an event is called _____.

▷ The probability of an impossible event is _____.

▷ The probability of a certain event is _____.

▷ All probability values are in the range from _____ to _____.

▷ To find the probability of an event occurring, you divide the number of times the outcome can occur by _____.

Practise the skill

1. The chances of you rowing across the Atlantic Ocean in a paddle boat are:

A ☐ 0

B ☐ between 0 and $\frac{1}{2}$

C ☐ 1 hour 55 minutes

D ☐ $\frac{1}{2}$

2. A four-sided spinner is divided into equal sectors, coloured red, yellow, blue and green.

The probability of the spinner landing on red when it is spun is:
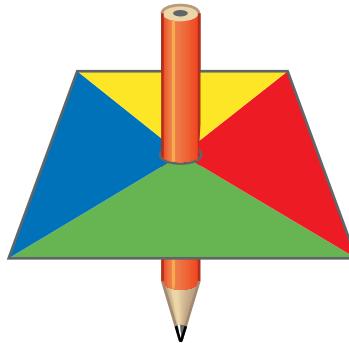
A ☐ 0

B ☐ $\frac{1}{4}$

C ☐ $\frac{1}{2}$

D ☐ 1

3. Rosie broke her arm last week in an accident. The probability that she will break her other arm this week is:

A ☐ impossible

B ☐ unlikely

C ☐ likely

D ☐ certain

4. A bag contains 1 black ball, 2 blue balls, 3 green balls and 4 red balls. If you pick a ball out at random, what is the probability that it will be blue?

A ☐ $\frac{1}{10}$

B ☐ $\frac{1}{5}$

C ☐ $\frac{2}{5}$

D ☐ $\frac{3}{5}$

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